

PATENT ABSTRACTS OF JAPAN

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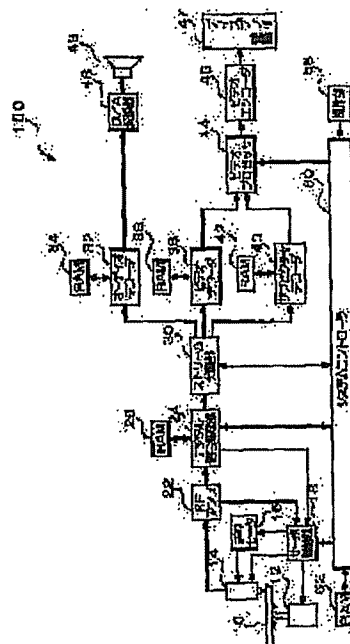
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(54) DISK REPRODUCING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a disk reproducing device which easily performs the reproducing operation corresponding to a specific operation where related display is not performed.

SOLUTION: A system controller 60 discriminates whether a hidden title is included in a DVD 10 or not on the basis of a navigation command and navigation parameters and recognizes a hidden command and analyzes the hidden command and an SPRM or GPRM used for execution of this hidden command, thereby automatically reproducing the hidden title or displaying operation contents for reproducing of the hidden title to perform various controls for reproducing of the hidden title at the time when a corresponding operation is indicated by a user.



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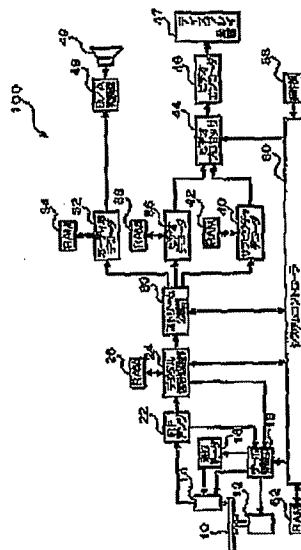
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(54) 【発明の名称】 ディスク再生装置

(57) 【要約】

【課題】 開通する表示がなされていない特定操作に対応する再生動作を容易に行わせることができるディスク再生装置を提供すること。

【解決手段】 システムコントローラ60は、ナビゲーションコマンドとナビゲーションパラメータに基づいて、DVD10に隠しタイトルが含まれているか否かを判定するとともに隠しコマンドを認識し、隠しコマンドおよびこの隠しコマンドを実行する際に用いられるSPRMやGPRMを解析することにより、隠しタイトルを自動再生したり、隠しタイトルを再生するための操作内容を表示して利用者によって対応する操作指示がされた場合に隠しタイトルを再生するための各種の制御を行う。



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CLAIMS

[Claim(s)]

[Claim 1] A disk reproduction device comprising:

A data reproduction means which reads a signal recorded on a disk type recording medium, and performs reproduction of a picture and a sound.

A specific operation judging means which judges whether specific operation by which a related display is not made during reproduction motion by said data reproduction means exists, and a specific operation extraction means to extract the contents of this specific operation when judged as that in which said specific operation exists by said specific operation judging means.

[Claim 2] A disk reproduction device having further a specific operation displaying means which displays the contents of said specific operation extracted by said specific operation extraction means in claim 1.

[Claim 3] A disk reproduction device having further a specific operation execution instruction means to perform directions which perform reproduction motion corresponding to said specific operation extracted by said specific operation extraction means in claim 1 to said data reproduction means.

[Claim 4] A disk reproduction device when said specific operation judging means follows regenerative data to reproduction orders, and regenerative data of these series and regenerative data without relation exist, wherein it judges it to be that in which said specific operation exists in either of claims 1-3.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the disk reproduction device which performs reproduction motion, such as a digital versatile disc (DVD).

[0002]

[Description of the Prior Art] In recent years, DVD attracts attention as a disk type recording medium. This DVD is [a diameter] 1.2 mm in thickness in 12 cm.

By raising storage density with the same shape as CD (compact disk), 4.7 GB is realized by a monolayer and the storage capacity of 8.5 GB is realized by two-layer.

Mass image data and audio information are stored in this DVD by adoption of the image data compression art by MPEG 2, or audio information compression technology.

Control information required for execution of various functions is also stored.

[0003] A DVD reproducer is for performing reproduction motion of DVD in which such various data was stored. The function which plays the contents of a disk in the turn beforehand set up by the maker with a DVD reproducer, for example, Functions of various kinds [time of playback], such as a function which plays the contents of a disk which displayed the menu screen for choosing various contents of a disk, and were chosen by the user, can be performed.

[0004]

[Problem(s) to be Solved by the Invention] By the way, in order to perform various functions which the DVD reproducer mentioned above, the user needs to give various kinds of operator guidance (for example, directions by key operation) to a DVD reproducer. Since various kinds of general operator guidance is written in the operation manual etc. or is displayed during reproduction motion, the user can learn the method of operator guidance easily.

[0005] However, DVD is not reproduced with such general operator guidance of various kinds of, The case where key operation becomes a predetermined combination, when

operator guidance that the contents of a disk are played in the given order is performed, etc., The contents of a disk (hidden title) which the command (secret command) only corresponding to the case where special operator guidance is performed is executed, and are played may be recorded. For example, apart from the image of this editing, the image etc. which photoed the situation of the photography spot as a hidden title may be recorded on DVD on which movie software was recorded.

[0006]Considering the case where such a hiding title is reproduced, in the conventional DVD reproducer, the specific operation for reproducing a hidden title must be found out, applying a trial-and-error method to the user itself performing various key operation etc. However, it was not easy for a user to find out such specific operation uniquely, since the timing which a related display is not made but performs the existence and its operation is not clear in many cases, and it could not be hidden as a result and was not able to reproduce a title in many cases.

[0007]this invention is created in view of such a point, and comes out. The purpose is to provide the disk reproduction device to which the reproduction motion corresponding to the specific operation by which the display to give is not made can be made to perform easily.

[0008]

[Means for Solving the Problem]In order to solve a technical problem mentioned above, a disk reproduction device of this invention, When it judges by a specific operation judging means and such specific operation exists, whether specific operation by which a related display is not made during reproduction motion by a data reproduction means exists, Since the contents of this specific operation are extracted and the contents of specific operation can be clarified by a specific operation extraction means, reproduction motion corresponding to that specific operation can be made to perform easily.

[0009]It is desirable to have a specific operation displaying means which displays the contents of specific operation extracted by a specific operation extraction means. Since it becomes possible to perform specific operation, looking at the display information, the user can make reproduction motion corresponding to specific operation perform easily, if the concrete contents of specific operation are displayed.

[0010]It is desirable to have a specific operation execution instruction means to perform directions which perform reproduction motion corresponding to specific operation extracted by a specific operation extraction means to a data reproduction means. Since directions of reproduction motion corresponding to specific operation are performed automatically, even if it is a case where a user does not know the contents of specific operation concretely, reproduction motion corresponding to specific operation can be made to perform easily.

[0011]As for a specific operation judging means mentioned above, it is desirable to follow regenerative data to reproduction orders, and to judge it as that in which specific operation exists, when regenerative data of these series and regenerative data without relation exist. In order to reproduce data which cannot be reproduced while performing a series of

reproduction motion, Since it is necessary to perform special reproduction instruction of some kind, data unreproducible in usual is easily renewable by clarifying by performing contents extraction of specific operation which mentioned such special operation above.

[0012]

[Embodiment of the Invention]It explains referring to drawings for the DVD reproducer of one embodiment which applied this invention hereafter.

[0013](1) inside ** of the data recorded on DVD -- explain first the details of the data recorded on DVD as a disk type recording medium. Drawing 1 is a figure showing the structure of the volume space of DVD. As shown in the figure, the volume space of DVD is constituted from inner circumference of DVD by the volume file structure, the DVD-Video zone, and the DVD other zone toward the periphery. Various kinds of data required for reproduction motion is contained among these in the DVD-Video zone. The DVD-Video zone is constituted by one or more video title sets (VTS) corresponding to a video manager (VMG) and each title.

[0014]Drawing 2 is a figure showing the data structure of VMG. VMG is constituted by the backup file (VMGI_BUP) of video manager information (VMGI), the video object set (VMGM_VOBS) for VMG menus, and VMGI as shown in the figure.

[0015]the information (for example, the number of VTS(s), and every -- the identification information of VTS.) concerning [VMGI] VTS Disk ID (DVD_ID) for identifying the display order of the title displayed on a title menu and one or more program chain information (PGCI), such as a storing position of each VTS in DVD, and DVD, etc. are contained. VMGM_VOBS is constituted by one or more video objects (VOB). This VOB contains the video data which is regenerative data at the time of reproducing the menu screen (title menu screen) for choosing a title.

[0016]Drawing 3 is a figure showing the data structure of VTS. As shown in the figure, VTS Video title set information (VTSI), It is constituted by the backup file (VTSI_BUP) of the video object set (VTSM_VOBS) for VTS menus, the video object set (VTSTT_VOBS) for VTS titles, and VTSI.

[0017]The information about titles, such as VTS_ID for VTSI to identify a title, one or more PGCI(s), etc. are contained. VTSM_VOBS and VTSTT_VOBS are constituted by one or more VOB(s). This VOB contains regenerative data, such as a video data and audio information.

[0018]Drawing 4 is a figure showing the data structure of VOB contained in VMGM_VOBS, VTSM_VOBS, and VTSTT_VOBS which were mentioned above. VOB is constituted by two or more cells as shown in the figure. And each cell is constituted by two or more video object units (VOBU). Each VOBU is constituted including at least one of a navigation pack (NV_PCK), a video pack (V_PCK) and a sub picture pack (SP_PCK), and the audio packs (A_PCK).

[0019]NV_PCK is constituted including reproduction control information (PCI) and data search information (DSI). A position of VOBU, data volume of VOBU, etc. which should be

reproduced next are set to PCI and DSI. V_PCK, SP_PCK, and A_PCK -- respectively -- the classification (an animation.) of regenerative data. It is constituted including the pack header and packet header in which information, including a sub picture, an audio, etc., is included, and the video data, sub picture data and audio information (compression regenerative data) by which the data compression was carried out.

[0020]The program chain (PGC) which is a logical batch in reproduction motion is constituted, program chain information (PGCI), and 1 or two or more VOB(s), i.e., two or more cells. For example, PGC is constituted by 1 in one PGCI in VMGI, and VMGM_VOBS, or two or more VOB(s). PGC is constituted by 1 in one PGCI in VTSI, and VTSM_VOBS, or two or more VOB(s). Or PGC is constituted by 1 in one PGCI in VTSI, and VTSTT_VOBS, or two or more VOB(s).

[0021]PGC constituted by PGCI in VMGI, 1 in VMGM_VOBS, or two or more VOB(s) is because the reproduction part of data is pinpointed, when the item of either of this title menu is chosen, while displaying a title menu. Various kinds of data required when PGC constituted by PGCI in VTSI, 1 in VTSTT_VOBS, or two or more VOB(s) is chosen [the item of either of the title menus], in order that contents may be reproduced is contained.

[0022]Drawing 5 is a figure showing an example of the structure of PGC, and the structure of PGC constituted by PGCI in VMGI, 1 in VMGM_VOBS, or two or more VOB(s) is shown. PGC#1 is constituted by PGCI#1 in VMGI, VOB#1 in VMGM_VOBS - #3 as shown in the figure. PGC#2 is constituted by PGCI#2 in VMGI, VOB#4 in VMGM_VOBS, and #5. These PGC(s) are specified by a PGC number. This PGC number is determined by the order of storing of PGCI in VMGI. For example, in PGC shown in drawing 5, since PGC is stored in order of PGCI#1 and PGCI#2 in VMGI, the PGC number of PGC#2 which the PGC number of PGC#1 constituted including PGCI#1 comprises including "1" and PGCI#2 is set to "2."

[0023]PGC constituted by PGCI in VTSI, 1 in VTSM_VOBS, or two or more VOB(s) and PGC constituted by PGCI in VTSI, 1 in VTSTT_VOBS, or two or more VOB(s) also have the same structure as PGC shown in drawing 5. The reproduction sequence of two or more corresponding VOB(s), the information about PGC which performs reproduction motion next, etc. are included in PGCI.

[0024]In the navigation command executed in the case of reproduction motion. The button command (BTN_CMD) executed corresponding to a user's operator guidance, There are a cell command (C_CMD) executed whenever reproduction of one cell in the PURIKO mand (PRE_CMD) performed before the reproduction start of PGC and PGC is completed, and a post command (POST_CMD) executed after the end of reproduction of PGC. Among these, BTN_CMD is contained in PCI mentioned above and PRE_CMD, C_CMD, and POST_CMD are contained in PGCI mentioned above.

[0025]At the time of execution of a navigation command, a navigation parameter is used as a variable. A system parameter (SPRM) and a general parameter (GPRM) are one of this navigation parameter, and each storing region is established in the inside of a DVD reproducer. SPRM and GPRM are set up or updated according to execution of a

navigation command, and are used as a variable at the time of execution of the navigation command after it.

[0026](2) Entire configuration drawing 6 of a DVD reproducer is a figure showing the entire configuration of the DVD reproducer of one embodiment which applied this invention. The spindle motor 12, the optical pickup 14, the feed motor 16, and the servo control section 18 for DVD reproducer 100 shown in the figure to read the signal recorded on DVD10, Amplification etc. of the read signal. Carry out and image display and voice response. RF amplifier 22 for carrying out, RAM 26, 34, 38, and 42 for buffers of 24 or 4 digital signal processing parts, the stream separation part 30, the audio decoder 32, the video decoder 36, the sub picture decoder 40, the video processor 44, the video encoder 46, It is constituted including the display device 47, the digital analog (D/A) converter 48 and the loudspeaker 49, the final controlling element 58 for a user to input various kinds of operator guidance, and system controller [for controlling whole DVD reproducer 100] 60, and RAM62.

[0027]The spindle motor 12 rotates DVD10 with fixed linear velocity. The optical pickup 14 detects the data recorded on DVD10, and the semiconductor laser and the photo-diode are built in. The feed motor 16 moves the optical pickup 14 to the diameter direction of DVD10.

[0028]The servo control section 18 moves the focal position of a semiconductor laser to the recording surface, perpendicular direction, and horizontal direction of DVD10 by moving the object lens (not shown) built in the optical pickup 14 while driving the spindle motor 12 and the feed motor 16 which were mentioned above. The servo control section 18 performs various kinds of servo (focus servo, tracking servo, rotation servo) control required for reading of the data from DVD10.

[0029]RF amplifier 22 amplifies the electrical signal outputted from the photo-diode built in the optical pickup 14, and if a big vibration, a shock, etc. are added to DVD reproducer 100 and a track jump occurs, it also has the function which outputs a track jump detecting signal.

[0030]To the signal outputted from RF amplifier 22, after changing the digital signal processing part 24 into digital data, it performs the signal recovery processing (8-16 recovery processing) and error correction processing according to the data format of DVD10, and it stores them in RAM26. And the digital signal processing part 24 extracts VOBUs, and outputs it to the stream separation part 30 while it extracts VMGI and VTSI from the data stored in RAM26 according to directions of the system controller 60 and outputs them to the system controller 60.

[0031]The stream separation part 30 by analyzing the pack header which constitutes VOBUs outputted from the digital signal processing part 24 according to directions of the system controller 60, An audio pack (A_PCK), a video pack (V_PCK), a sub picture pack (SP_PCK), and a navigation pack (NV_PCK) are separated. The audio pack separated by the stream separation part 30 is outputted to the audio decoder 32, A video pack is

outputted to the video decoder 36, a sub picture pack is outputted to the sub picture decoder 40, and a navigation pack is transmitted to the system controller 60.

[0032]The audio decoder 32 performs predetermined decoding to the audio pack outputted from the stream separation part 30, and outputs audio information. The video decoder 36 performs predetermined decoding to the video pack outputted from the stream separation part 30, and outputs a video data. The sub picture decoder 40 performs predetermined decoding to the sub picture pack outputted from the stream separation part 30, and outputs sub picture data.

[0033]The video processor 44 generates the image data which compounded the video data outputted from the video decoder 36, and the sub picture data outputted from the sub picture decoder 40 according to directions of the system controller 60, and outputs it to the video encoder 46. The video encoder 46 changes into the picture signal for a display the image data outputted from the video processor 44. A picture is displayed by outputting this picture signal to the display device 47.

[0034]D/A converter 48 changes into the audio signal of an analog the audio information outputted from the audio decoder 32. Reproduction of an audio sound is performed by outputting this audio signal to the loudspeaker 49.

[0035]The final controlling element 58 is provided with various operation keys, such as a hiding title key for giving the reproduction key for giving directions of title reproduction, and directions of hidden title reproduction, and the signal according to the operating condition of the key is outputted towards the system controller 60.

[0036]The system controller 60 performs control of all the functional blocks, such as outputting various kinds of servo commands to the servo control section 18, or outputting the image generation directions according to the user's operator guidance to the video processor 44. VMGI contained in the data in which the system controller 60 is outputted from the digital signal processing part 24, Various kinds of control required for reproduction motion is performed to stream separation part 30 grade by receiving VTSI and NV_PCK outputted from the stream separation part 30, and executing the navigation command contained in these. Using RAM62 as a storing region of a navigation parameter (SPRM and GPRM), the system controller 60 responds to execution of a navigation command, and sets up or updates SPRM and GPRM, It uses as a variable at the time of execution of the navigation command after it.

[0037]When the system controller 60 follows the title reproduced one after another according to screen branching from the title reproduced first based on the navigation command and the navigation parameter, The title which serves as a reproduction object in the usual reproduction motion is grasped, and when titles other than the title which serves as a reproduction object in this usual reproduction motion are recorded on DVD10, that title is hidden and it is recognized as it being a title. Next, the navigation command with which the stored address of this hiding title is described is recognized that the system controller 60 is a command (secret command) for reproducing a hidden title.

[0038]The system controller 60 performs various kinds of control for reproducing a hidden title by analyzing SPRM and GPRM which are used when executing a secret command and this secret command. For example, the system controller 60 performs control which executes and hides a secret command and reproduces a title automatically. When a user performs the operator guidance, the system controller 60 performs control which executes and hides a secret command and reproduces a title, while displaying the contents of operation for reproducing a hidden title.

[0039]Whole DVD reproducer 100 mentioned above corresponds to a data reproduction means, the system controller 60 corresponds to a specific operation judging means, a specific operation extraction means, and a specific operation execution instruction means, and the display device 47 corresponds to a specific operation displaying means, respectively.

[0040](3) Give and explain three examples about operation of a DVD reproducer, next the reproduction motion of the hiding title in DVD reproducer 100 mentioned above. Drawing 7 is a flow chart showing the operation procedures in the case of reproducing a hidden title automatically in DVD reproducer 100.

[0041]The system controller 60 judges whether it was loaded with DVD10 by the user (Step 100). If loaded with DVD10, the system controller 60 will indicate the opening screen by fixed time next (Step 101). For example, based on PGCI contained in VMG, VOB corresponding to an opening screen is read and the display of a predetermined opening screen is performed.

[0042]Next, the system controller 60 judges whether the hiding title key with which the final controlling element 58 was equipped was pressed by the user (Step 102). Even if it carries out specified time elapse from the display of an opening screen, when the hidden title key is not pressed, the system controller 60 controls the usual reproduction motion (Step 103).

[0043]When the hidden title key is pressed within predetermined time from the display of an opening screen, the system controller 60 is hidden in DVD10 and it is judged whether the title is contained or not (Step 104). Since the reproduction instruction of a hidden title is made when a user performs specific operation in the state where no displays of related operator guidance etc. are made, this decision processing is also judging whether the specific operation to which a related indication is not given existing. VMGI to which the system controller 60 is specifically outputted from the digital signal processing part 24, VTSI and NV_PCK outputted from the stream separation part 30 are received, By following the title reproduced according to screen branching from the title reproduced first based on the navigation command and navigation parameter which are contained in these, When titles other than the title which grasps all the titles which serve as a reproduction object in the usual reproduction motion, and serves as a reproduction object in this usual reproduction motion are contained in DVD10, That is, when an unreproducible title exists depending on normal operation, the title is hidden and it is recognized as it being a title.

[0044]When it hides in DVD10 and the title is not contained, the system controller 60

performs control of (Step 105) and the usual reproduction motion, after indicating the screen which notifies a user of there being no hidden title by fixed time (Step 106).

[0045]When it hides in DVD10 and the title is contained, the system controller 60 searches the command for reproducing this hiding title (Step 107). Specifically, it is recognized as the system controller 60 being a command (secret command) for hiding the navigation command with which the stored address of the hidden title is described, and reproducing a title.

[0046]The system controller 60 controls the reproduction motion of a hidden title by executing a secret command after search of a secret command (Step 108). When two or more hiding titles are contained in DVD10, either hides and a title is reproduced.

[0047]It is judged after the end of reproduction of a hidden title whether the system controller 60 has other hiding titles which are not reproduction objects yet by analyzing SPRM and GPRM which are used when executing a secret command and this secret command (Step 109). When other hiding titles which are not reproduction objects cannot be found, the system controller 60 controls the usual reproduction motion (Step 110). When there are other hiding titles which are not reproduction objects, control (Step 108) which reproduces the hiding title is performed.

[0048]Although the hidden title was reproduced automatically, it hides according to a user's directions and may be made to reproduce a title in the operation procedures mentioned above. Drawing 8 is a flow chart showing the operation procedures in the case of hiding according to a user's directions and reproducing a title in DVD reproducer 100. About operation from Step 201 to Step 207, since it is the same as that of operation from Step 100 shown in drawing 7 to Step 107, the explanation is omitted.

[0049]The system controller 60 recognizes the contents of operation for reproducing a hidden title after the end of secret command search (Step 207) by analyzing SPRM and GPRM which are used when executing a secret command and this secret command (Step 208). When two or more hiding titles are contained in DVD10, the contents of operation are recognized for every hiding title.

[0050]And the system controller 60 displays the screen of the contents of operation for reproducing a hidden title on the display device 47 (Step 209). Specifically, the system controller 60 issues the directions which display the screen (screen in which it was shown which key is operated to which timing) of the contents of operation for reproducing a hidden title to the video processor 44. The video processor 44 generates the image data of the contents of operation for reproducing a hidden title according to directions of the system controller 60, and outputs it to the video encoder 46. The video encoder 46 changes into the picture signal for a display the image data outputted from the video processor 44, and outputs it to the display device 47. Thus, the screen which suggested the concrete contents of operation for reproducing a hidden title is displayed on the display device 47. When two or more hiding titles are contained in DVD10, the contents of operation for either hiding and reproducing a title are displayed.

[0051]Next, the system controller 60 judges whether the operator guidance for reproducing a hidden title was made by the user (Step 210). After the contents of operation for reproducing a hidden title are displayed on the display device 47, when operator guidance [/ in fixed time] is made, the system controller 60 controls the reproduction motion of a hidden title by executing a secret command (Step 211).

[0052]It is judged after the end of reproduction of a hidden title whether the system controller 60 has other hiding titles which are not reproduction objects yet by analyzing SPRM and GPRM which are used when executing a secret command and this secret command (Step 212). When other hiding titles which are not reproduction objects cannot be found, the system controller 60 controls the usual reproduction motion (Step 213). When there are other hiding titles which are not reproduction objects, in order to reproduce the hiding title, the system controller 60 repeats the operation after the control (Step 209) on which the screen of the operator guidance for reproducing a hidden title is displayed.

[0053]After the operator guidance for reproducing a hidden title is displayed on the display device 47, when operator guidance [/ in fixed time] is not carried out (when a negative judgment is carried out at Step 210), It is judged whether the system controller 60 has other hiding titles which are not reproduction objects yet, without reproducing a corresponding hiding title (Step 212). When other hiding titles which are not reproduction objects cannot be found, the system controller 60 controls the usual reproduction motion (Step 213). When there are other hiding titles which are not reproduction objects, in order to reproduce other hiding titles, the system controller 60 repeats the operation after the control (Step 209) on which the screen of the operator guidance for reproducing a hidden title is displayed.

[0054]By the way, although the operation procedures shown in drawing 7 mentioned above or drawing 8 explained the case where hide when the usual reproduction motion is not performed, and a title was reproduced, For example, when the scene set to the usual reproduction motion is reproduced, the hiding title related to the scene may be able to be reproduced. Drawing 9 is a flow chart showing the operation procedures in the case of hiding when the usual reproduction motion is performed, and reproducing a title in DVD reproducer 100.

[0055]The system controller 60 judges whether in parallel to control (Step 300) of the usual reproduction motion, the hiding title key with which the final controlling element 58 was equipped by the user was pressed (Step 301).

[0056]When the hidden title key is pressed, next, the system controller 60 is hidden in DVD10 and it is judged whether the title is contained or not (Step 302). Concrete operation is the same as operation of Step 104 shown in drawing 7.

[0057]When it hides in DVD10 and the title is not contained, the system controller 60 indicates the screen which notifies a user of there being no hidden title by fixed time (Step 303), and continues control of the usual reproduction motion (Step 300).

[0058]When it hides in DVD10 and the title is contained, the system controller 60 searches

the command for reproducing this hiding title (Step 304). Concrete operation is the same as operation of Step 107 shown in drawing 7.

[0059]Next, by analyzing SPRM and GPRM which are used when the system controller 60 executes a secret command and this secret command, While recognizing the operator guidance for reproducing a hidden title (Step 305), the reproduction timing (timing which can receive the operator guidance for reproducing a hidden title) of a hidden title is recognized (Step 306). When two or more hiding titles are contained in DVD10, the contents of operation and reproduction timing are recognized for every hiding title.

[0060]Next, the system controller 60 judges whether the reproduction timing of all the hiding titles already passed based on the reproduction timing of the hiding title recognized in Step 306 (Step 307). When the reproduction timing of all the hiding titles has already passed, the system controller 60 indicates the screen which reports that reproduction timing already passed by fixed time (Step 308), and continues control of the usual reproduction motion (Step 300).

[0061]When no reproduction timing of hidden titles has passed yet, it is judged whether next, the usual reproduction motion was continued, and the system controller 60 was hidden, and became the reproduction timing of the title (Step 309). When it becomes the reproduction timing of a hidden title, the system controller 60 displays the screen of the contents of operation for reproducing a hidden title (Step 310). Specifically, the system controller 60 issues the directions which display the screen of the contents of operation for reproducing a hidden title to the video processor 44. According to directions of the system controller 60, the video processor 44, The image data which combined the contents picture of operation for hiding in the sub picture data outputted from the video data outputted from the video decoder 36 or the sub picture decoder 40, and reproducing a title is generated, and it outputs to the video encoder 46. The video encoder 46 changes into the picture signal for a display the image data outputted from the video processor 44, and outputs it to the display device 47. The contents of operation for reproducing a hidden title are displayed on the display device 47. When two or more hiding titles are contained in DVD10, the contents of operation for either hiding and reproducing a title are displayed.

[0062]Next, the system controller 60 judges whether operator guidance for reproducing a hidden title was carried out (Step 311). When operator guidance corresponding to between the timing which can receive the operator guidance for reproducing a hidden title is carried out, the system controller 60 controls the reproduction motion of a hidden title by executing a secret command (Step 312).

[0063]It is judged after the end of reproduction of a hidden title whether the system controller 60 has other hiding titles at which reproduction timing has not arrived yet by analyzing SPRM and GPRM which are used when executing a secret command and this secret command (Step 313).

[0064]When operator guidance corresponding to between the timing which can receive the operator guidance for reproducing a hidden title is not carried out (when a negative

judgment is carried out at Step 311), It is judged whether the system controller 60 has other hiding titles at which reproduction timing has not arrived yet, without reproducing a corresponding hiding title (Step 313).

[0065]When other hiding titles at which reproduction timing has not arrived cannot be found, the system controller 60 continues control of the usual reproduction motion (Step 300). (when a negative judgment is carried out at Step 313) When there are other hiding titles at which reproduction timing has not arrived (when an affirmative judgment is carried out at Step 313), In order to reproduce the hiding title, the system controller 60 repeats the operation after the judgment (Step 309) of whether to have become the reproduction timing of the hidden title.

[0066]Thus, DVD reproducer 100 of this embodiment, Based on a navigation command and a navigation parameter, hid in DVD10, and while recognizing whether the title is contained or not, the secret command is recognized, By analyzing SPRM and GPRM which are used when executing a secret command and this secret command, Various kinds of control for hiding, when operator guidance which displays the operator guidance for reproducing a hidden title automatically or reproducing a hidden title, and corresponds by a user is carried out, and reproducing a title is performed. Therefore, the user itself does not need to find out the operator guidance for reproducing a hidden title like [in the case of hiding with the conventional DVD reproducer and reproducing a title], and it becomes possible to reproduce a hidden title easily.

[0067]This invention is not limited to the above-mentioned embodiment, and various modification implementation is possible for it within the limits of the gist of this invention. For example, after being loaded with DVD10, it may be made have reproduced the hidden title in the embodiment shown in drawing 7 or drawing 8, only when a user pressed the hiding title key with which the final controlling element 58 was equipped, but to reproduce a hidden title promptly. When it hides while performing the usual reproduction motion, and the title key is pressed, it may be made to start the hidden title reproduction motion shown in drawing 7 or drawing 8.

[0068]Although the operator guidance for reproducing a hidden title was displayed on the display device 47 in the embodiment shown in drawing 8 or drawing 9, an audio sound is outputted from the loudspeaker 49 and it may be made to notify a user.

[0069]Followed the usual regenerative data in order, in the embodiment mentioned above, when the title which is not reproduced in this reproduction motion of a series of existed, hide this, judge that it is a title, and extracted the contents of operation of the corresponding secret command, but. For example, the title reproduced when this secret command is executed is hidden, and it may be made judge this command to be a secret command, and to treat, when a certain command request has come out and no displays of a related button etc. are made noting that it is a title.

[0070]

[Effect of the Invention]It is judged by a specific operation judging means whether as

mentioned above, according to this invention, the specific operation by which a related display is not made during the reproduction motion by a data reproduction means exists, Since the contents of this specific operation are extracted and the contents of specific operation can be clarified by a specific operation extraction means when such specific operation exists, the reproduction motion corresponding to that specific operation can be made to perform easily.

[Translation done.]

* NOTICES *

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is a figure showing the structure of the volume space of DVD.

[Drawing 2] It is a figure showing the data structure of VMG.

[Drawing 3] It is a figure showing the data structure of VTS.

[Drawing 4] It is a figure showing the data structure of VOB.

[Drawing 5] It is a figure showing an example of the structure of PGC.

[Drawing 6] It is a figure showing the entire configuration of the DVD reproducer of one embodiment.

[Drawing 7] It is a flow chart showing the operation procedures in the case of hiding in the DVD reproducer of one embodiment and reproducing a title automatically.

[Drawing 8] It is a flow chart showing the operation procedures in the case of hiding according to a user's directions in the DVD reproducer of one embodiment, and reproducing a title.

[Drawing 9] It is a figure showing the operation procedures in the case of hiding according to a user's directions in the DVD reproducer of one embodiment during the usual reproduction motion, and reproducing a title.

[Description of Notations]

10 DVD

18 Servo control section

24 Digital signal processing part

30 Stream separation part

32 Audio decoder

36 Video decoder

40 Sub picture decoder

44 Video processor

58 Final controlling element

60 System controller

62 RAM

[Translation done.]